

What is claimed is:

1. An organic electroluminescent element comprising a light emission layer containing a phosphorescent compound and a hole transporting layer adjacent thereto containing a hole transporting material, wherein the hole transporting material has a 0-0 band of the phosphorescence spectra of from 300 to 450 nm and has a molecular weight of not less than 550.

2. The organic electroluminescent element of claim 1, wherein the hole transporting material has an ionization potential  $I_{p1}$  of from 5.00 to 5.70 eV.

3. The organic electroluminescent element of claim 1, wherein

$$-0.1 \text{ (eV)} \leq I_{p3} - I_{p1} \leq 0.5 \text{ (eV)}$$

where  $I_{p1}$  (eV) represents the ionization potential of the hole transporting material, and  $I_{p3}$  (eV) represents the ionization potential of the phosphorescent compound.

4. The organic electroluminescent element of claim 1, wherein

$$0.5 \text{ (eV)} < T3 - E_{a1} < 1.3 \text{ (eV)}$$

where  $T3$  (eV) represents the excited triplet energy level of the phosphorescent compound and  $E_{a1}$  (eV) represents the electron affinity of the hole transporting material.

5. The organic electroluminescent element of claim 1, wherein the phosphorescent compound has a phosphorescence maximum in the wavelength regions of from 380 to 480 nm.

6. The organic electroluminescent element of claim 1, further comprising a second hole transporting layer containing a second hole transporting material, the second hole transporting layer being provided on the surface of the hole transporting layer opposite the light emission layer, wherein

$$0.1 \text{ (eV)} < \text{Ip1} - \text{Ip4} < 0.7 \text{ (eV)}$$

where Ip1 (eV) represents the ionization potential of the hole transporting material, and Ip4 (eV) represents the ionization potential of the second hole transporting material.

7. The organic electroluminescent element of claim 6, wherein the thickness of the hole transporting layer adjacent to the light emission layer is from 5 to 20 nm.

8. The organic electroluminescent element of claim 1, wherein the light emission layer further contains a host compound.

9. The organic electroluminescent element of claim 8, wherein

$$0.3 \text{ (eV)} < \text{Ip2} - \text{Ip1} < 1.0 \text{ (eV)}$$

where  $Ip1$  (eV) represents the ionization potential of the hole transporting material and  $Ip2$  (eV) represents the ionization potential of the host compound.

10. The organic electroluminescent element of claim 8, wherein

$$0.1 \text{ (eV)} < Ea2 - Ea1 < 0.8 \text{ (eV)}$$

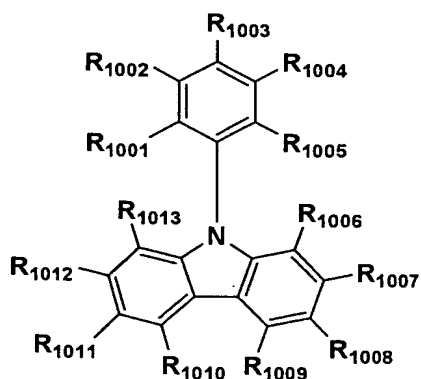
where  $Ea1$  (eV) represents the electron affinity of the hole transporting material and  $Ea2$  (eV) represents the electron affinity of the host compound.

11. The organic electroluminescent element of claim 8, wherein the host compound has a 0-0 band of the phosphorescence spectra of from 300 to 450 nm.

12. The organic electroluminescent element of claim 8, wherein the host compound is a carbazole derivative.

13. The organic electroluminescent element of claim 12, wherein the carbazole derivative is a compound represented by the following formula 11,

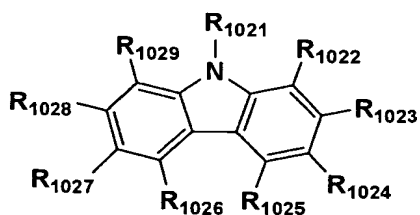
Formula 11



wherein R<sub>1001</sub> through R<sub>1013</sub> independently represent a hydrogen atom or a substituent, provided that at least one of R<sub>1001</sub> through R<sub>1013</sub> is a substituent.

14. The organic electroluminescent element of claim 12, wherein the carbazole derivative is a compound represented by the following formula 12,

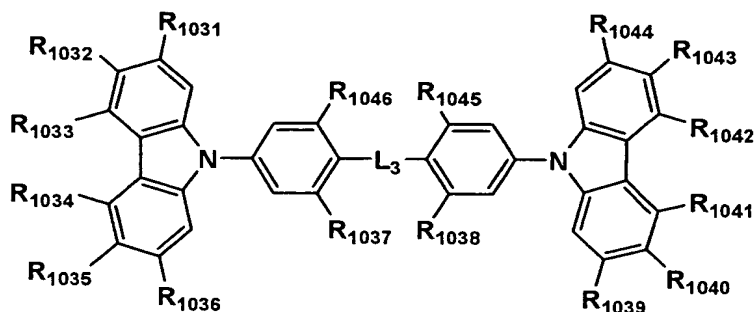
Formula 12



wherein R<sub>1021</sub> represents an alkyl group, a cycloalkyl group or a fluoroalkyl group; and R<sub>1022</sub> through R<sub>1029</sub> independently represent a hydrogen atom or a substituent, provided that at least one of R<sub>1022</sub> through R<sub>1029</sub> is a substituent.

15. The organic electroluminescent element of claim 12, wherein the carbazole derivative is a compound represented by the following formula 13,

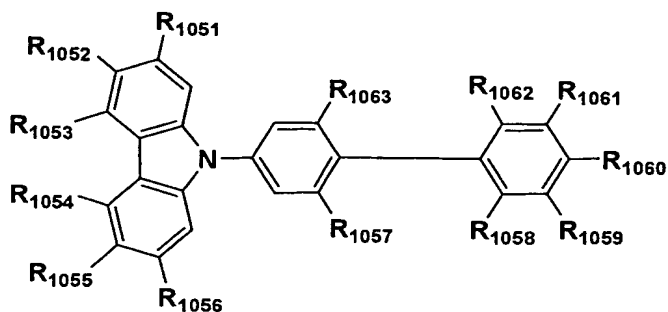
Formula 13



wherein R<sub>1031</sub> through R<sub>1046</sub> independently represent a hydrogen atom or a substituent; and L<sub>3</sub> represents a chemical bond or a divalent linkage group, provided that when L<sub>3</sub> represents a chemical bond, at least one of R<sub>1037</sub>, R<sub>1038</sub>, R<sub>1045</sub>, and R<sub>1046</sub> is a substituent.

16. The organic electroluminescent element of claim 12, wherein the carbazole derivative is a compound represented by the following formula 14,

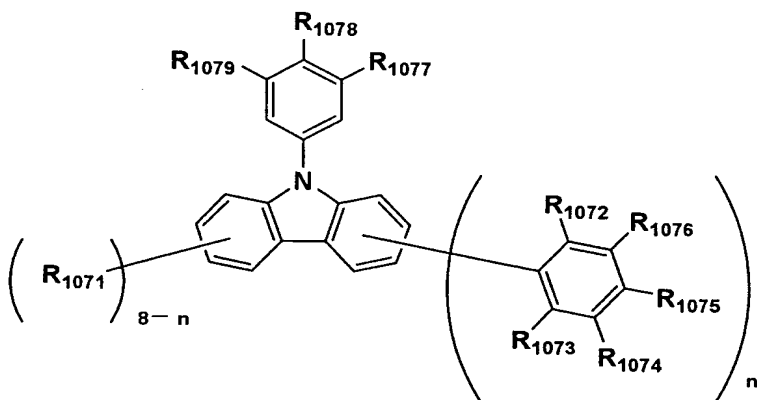
Formula 14



wherein  $R_{1051}$  through  $R_{1063}$  independently represent a hydrogen atom or a substituent, provided that at least one of  $R_{1057}$ ,  $R_{1058}$ ,  $R_{1062}$ , and  $R_{1063}$  is a substituent.

17. The organic electroluminescent element of claim 12, wherein the carbazole derivative is a compound represented by the following formula 15,

Formula 15

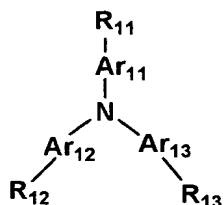


wherein  $R_{1071}$  through  $R_{1079}$  independently represent a hydrogen atom or a substituent, provided that at least one of  $R_{1072}$  and  $R_{1073}$  is a substituent; and  $n$  is an integer of from 1 to 8.

18. The organic electroluminescent element of claim 1, wherein the hole transporting material is a triarylamine compound.

19. The organic electroluminescent element of claim 18, wherein the triarylamine compound is a compound represented by the following formula 1,

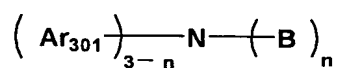
Formula 1



wherein  $Ar_{11}$  through  $Ar_{13}$  independently represent a substituted or unsubstituted aryl group or a substituted or unsubstituted heteroaryl group; and  $R_{11}$  through  $R_{13}$  independently represent a hydrogen atom or a substituent, provided that at least one of  $R_{11}$  through  $R_{13}$  is a substituent.

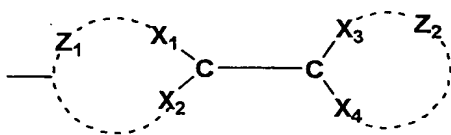
20. The organic electroluminescent element of claim 18, wherein the triarylamine compound is a compound represented by the following formula 2,

Formula 2



wherein Ar<sub>301</sub> represents a substituted or unsubstituted aryl group or a substituted or unsubstituted heteroaryl group; n is an integer of from 1 to 3; and B represents the following formula 3,

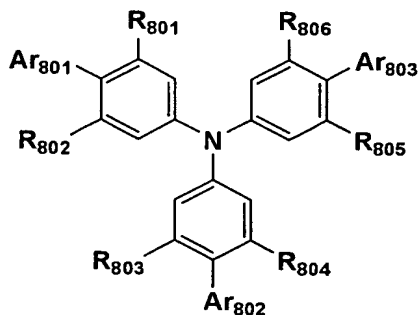
Formula 3



wherein Z<sub>1</sub> and Z<sub>2</sub> independently represent an atomic group necessary to form an aromatic hydrocarbon ring or an aromatic heterocyclic ring; and X<sub>1</sub> through X<sub>4</sub> independently represent N, O, S or C-R<sub>301</sub> in which R<sub>301</sub> represents a hydrogen atom or a substituent, provided that at least one of X<sub>1</sub> through X<sub>4</sub> represents C-R<sub>301</sub> in which R<sub>301</sub> represents a substituent.

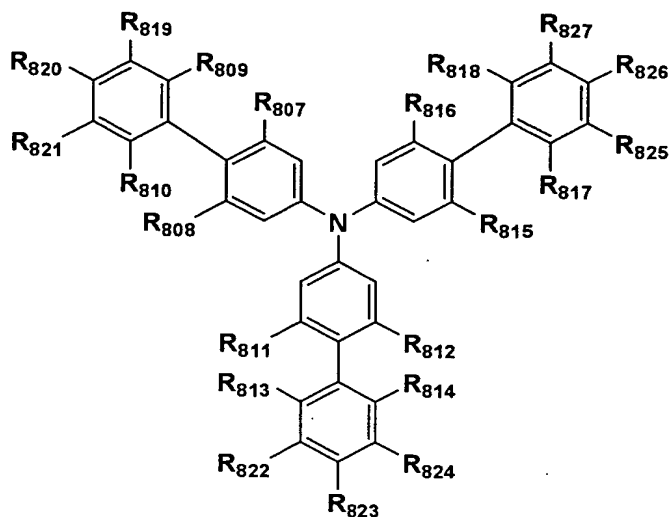
21. The organic electroluminescent element of claim 18, wherein the triarylamine compound is a compound represented by the following formula 4-1 or 4-2,

Formula 4-1





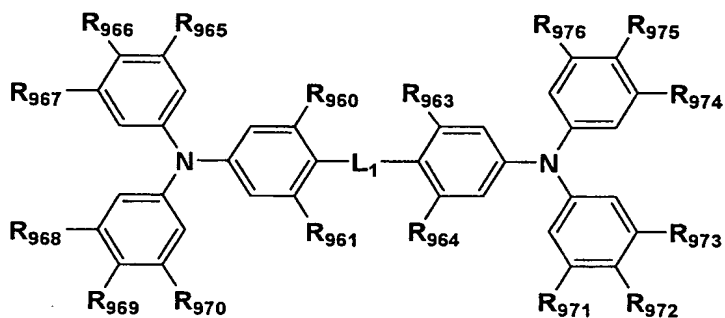
Formula 4-2



wherein Ar<sub>801</sub> through Ar<sub>803</sub> independently represent a substituted or unsubstituted aryl group or a substituted or unsubstituted heteroaryl group; and R<sub>801</sub> through R<sub>827</sub> independently represent a hydrogen atom or a substituent, provided that at least one of R<sub>801</sub> and R<sub>802</sub> is a substituent, at least one of R<sub>803</sub> and R<sub>804</sub> is a substituent, at least one of R<sub>805</sub> and R<sub>806</sub> is a substituent, at least one of R<sub>807</sub> through R<sub>810</sub> is a substituent, at least one of R<sub>811</sub> through R<sub>814</sub> is a substituent, and at least one of R<sub>815</sub> through R<sub>818</sub> is a substituent.

22. The organic electroluminescent element of claim 18, wherein the triarylamine compound is a compound represented by the following formula 5,

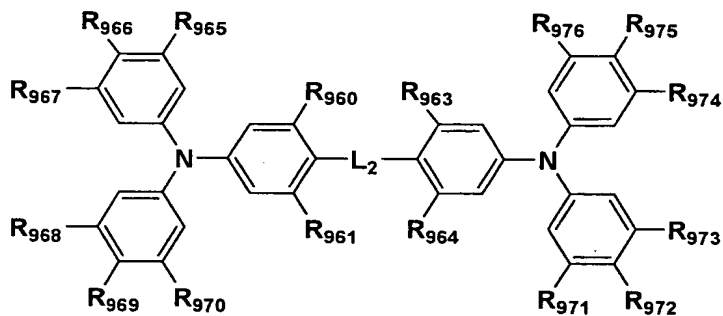
Formula 5



wherein  $R_{960}$  through  $R_{976}$  independently represent a hydrogen atom or a substituent, provided that at least one of  $R_{960}$  and  $R_{961}$  is a substituent and at least one of  $R_{963}$  and  $R_{964}$  is a substituent; and  $L_1$  represents a chemical bond or a divalent linkage group.

23. The organic electroluminescent element of claim 18, wherein the triarylamine compound is a compound represented by the following formula 6,

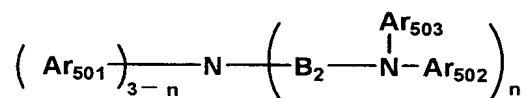
Formula 6



wherein R<sub>960</sub> through R<sub>976</sub> independently represent a hydrogen atom or a substituent; and L<sub>2</sub> represents an alkylene group, a cycloalkylene group or a fluoroalkylene group.

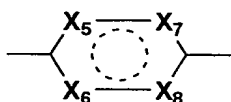
24. The organic electroluminescent element of claim 18, wherein the triarylamine compound is a compound represented by the following formula 7,

Formula 7



wherein Ar<sub>501</sub> through Ar<sub>503</sub> independently represent a substituted or unsubstituted aryl group or a substituted or unsubstituted heteroaryl group; n is an integer of from 1 to 3; and B<sub>2</sub> represents the following formula 8,

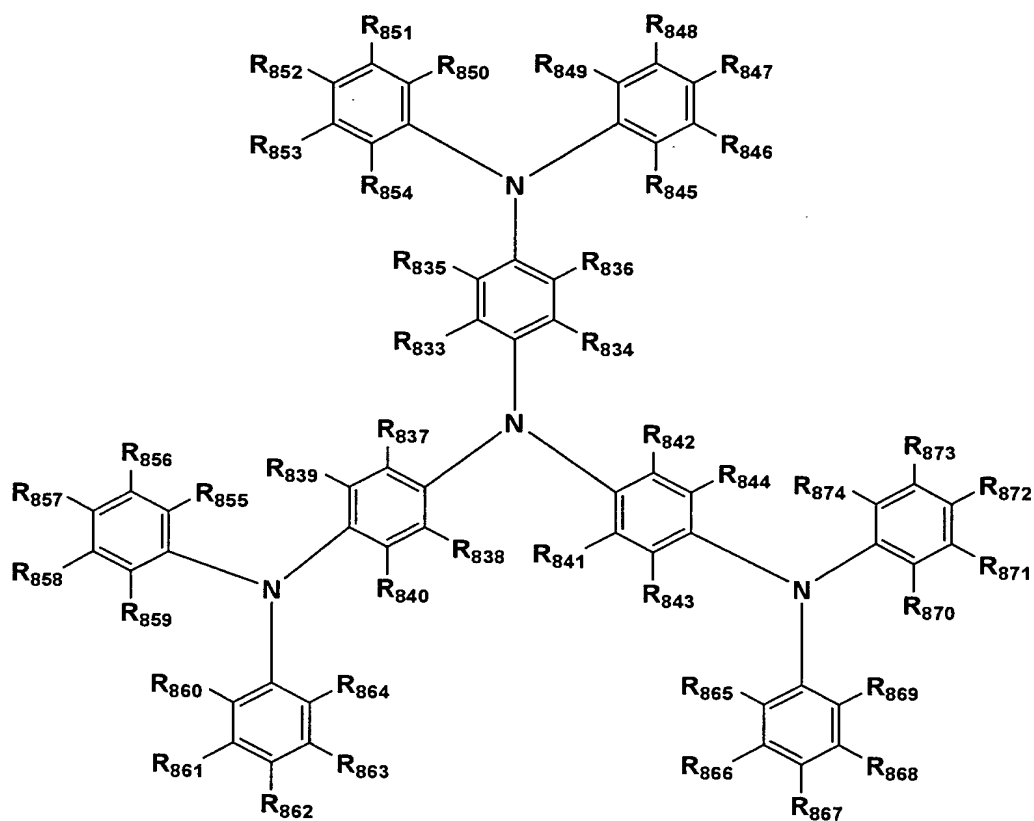
Formula 8



wherein X<sub>5</sub> and X<sub>8</sub> independently represent N or C-R<sub>501</sub> in which R<sub>501</sub> represents a hydrogen atom or a substituent, provided that at least one of X<sub>5</sub> and X<sub>6</sub> represents C-R<sub>501</sub> in which R<sub>501</sub> represents a substituent, and at least one of X<sub>7</sub> and X<sub>8</sub> represents C-R<sub>501</sub> in which R<sub>501</sub> represents a substituent.

25. The organic electroluminescent element of claim 18, wherein the triarylamine compound is a compound represented by the following formula 9,

Formula 9

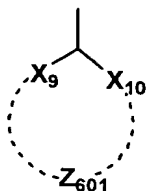


wherein R<sub>833</sub> through R<sub>874</sub> independently represent a hydrogen atom or a substituent, provided that at least one of R<sub>833</sub> and R<sub>834</sub> is a substituent, at least one of R<sub>835</sub> and R<sub>836</sub> is a substituent, at least one of R<sub>837</sub> and R<sub>838</sub> is a substituent, at least one of R<sub>839</sub> and R<sub>840</sub> is a substituent, at least one of

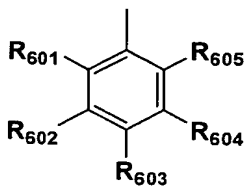
$R_{841}$  and  $R_{842}$  is a substituent, and at least one of  $R_{843}$  and  $R_{844}$  is a substituent.

26. The organic electroluminescent element of claim 18, wherein the triarylamine compound comprises a terminal group represented by the following formula 10-1, 10-2, 10-3 or 10-4,

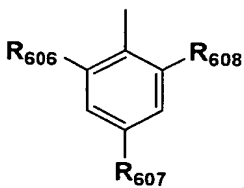
Formula 10-1



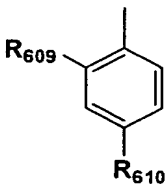
Formula 10-2



Formula 10-3



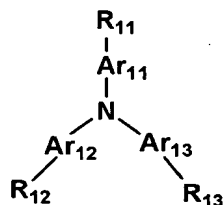
Formula 10-4



wherein  $X_9$  and  $X_{10}$  independently represent N, O, S or  $CR_{611}$  in which  $R_{611}$  represents a hydrogen atom or a substituent, provided that at least one of  $X_9$  and  $X_{10}$  represents  $CR_{611}$  in which  $R_{611}$  represents a substituent;  $Z_{601}$  represents an atomic group necessary to form an aromatic hydrocarbon ring or an aromatic heterocyclic ring;  $R_{601}$  through  $R_{605}$  independently represent a hydrogen atom or a substituent, provided that at least one of  $R_{601}$  and  $R_{605}$  is a substituent; and  $R_{606}$  through  $R_{610}$  independently represent a substituent.

27. An organic electroluminescent element comprising a light emission layer containing a phosphorescent compound and a hole transporting layer adjacent thereto containing a hole transporting material, wherein the hole transporting material is a triarylamine compound represented by the following formula 1,

Formula 1

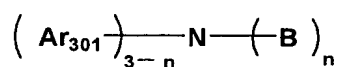


wherein  $Ar_{11}$  through  $Ar_{13}$  independently represent a substituted or unsubstituted aryl group or a substituted or unsubstituted heteroaryl group;  $R_{11}$  through  $R_{13}$  independently

represent a hydrogen atom or a substituent, provided that at least one of  $R_{11}$  through  $R_{13}$  is a substituent.

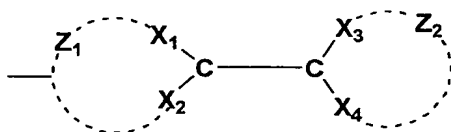
28. The organic electroluminescent element of claim 27, wherein the triarylamine compound is a compound represented by the following formula 2,

Formula 2



wherein  $\text{Ar}_{301}$  represents a substituted or unsubstituted aryl group or a substituted or unsubstituted heteroaryl group;  $n$  is an integer of from 1 to 3; and B represents the following formula 3,

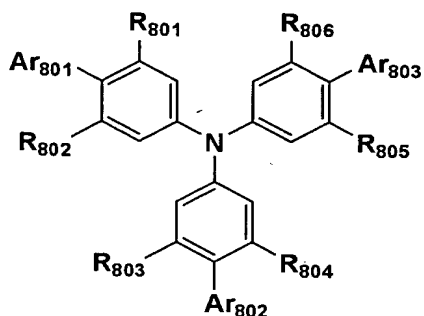
Formula 3



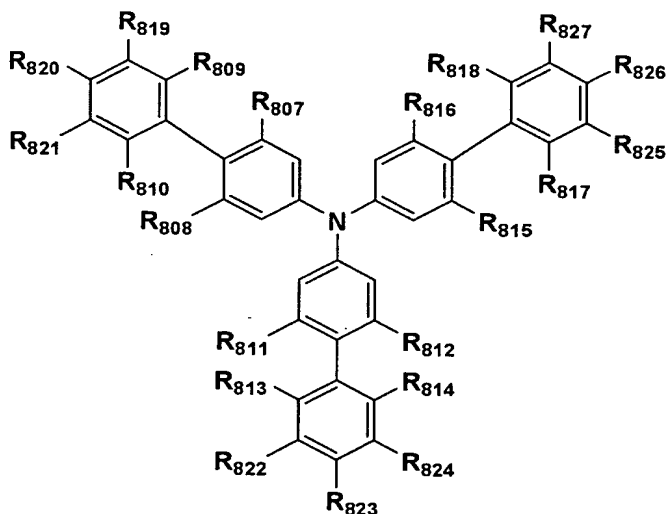
wherein  $Z_1$  and  $Z_2$  independently represent an atomic group necessary to form an aromatic hydrocarbon ring or an aromatic heterocyclic ring; and  $X_1$  through  $X_4$  independently represent N, O, S or C- $R_{301}$  in which  $R_{301}$  represents a hydrogen atom or a substituent, provided that at least one of  $X_1$  through  $X_4$  represents C- $R_{301}$  in which  $R_{301}$  represents a substituent.

29. The organic electroluminescent element of claim 27, wherein the triarylamine compound is a compound represented by the following formula 4-1 or 4-2,

Formula 4-1



Formula 4-2



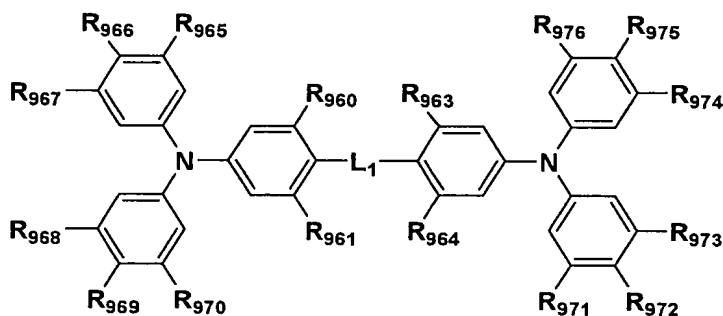
wherein Ar<sub>801</sub> through Ar<sub>803</sub> independently represent a substituted or unsubstituted aryl group or a substituted or unsubstituted heteroaryl group; and R<sub>801</sub> through R<sub>827</sub> independently represent a hydrogen atom or a substituent,



provided that at least one of  $R_{801}$  and  $R_{802}$  is a substituent, at least one of  $R_{803}$  and  $R_{804}$  is a substituent, at least one of  $R_{805}$  and  $R_{806}$  is a substituent, at least one of  $R_{807}$  through  $R_{810}$  is a substituent, at least one of  $R_{811}$  through  $R_{814}$  is a substituent, and at least one of  $R_{815}$  through  $R_{818}$  is a substituent.

30. The organic electroluminescent element of claim 27, wherein the triarylamine compound is a compound represented by the following formula 5,

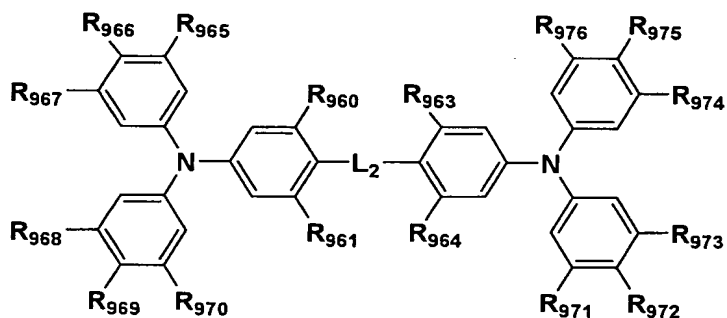
Formula 5



wherein  $R_{960}$  through  $R_{976}$  independently represent a hydrogen atom or a substituent, provided that at least one of  $R_{960}$  and  $R_{961}$  is a substituent, and at least one of  $R_{963}$  and  $R_{964}$  is a substituent; and  $L_1$  represents a chemical bond or a divalent linkage group.

31. The organic electroluminescent element of claim 27, wherein the triarylamine compound is a compound represented by the following formula 6,

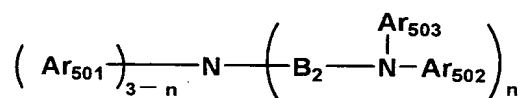
Formula 6



wherein  $R_{960}$  through  $R_{976}$  independently represent a hydrogen atom or a substituent; and  $L_2$  represents an alkylene group, a cycloalkylene group or a fluoroalkylene group.

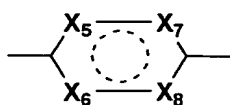
32. The organic electroluminescent element of claim 27, wherein the triarylamine compound is a compound represented by the following formula 7,

Formula 7



wherein  $\text{Ar}_{501}$  through  $\text{Ar}_{503}$  independently represent a substituted or unsubstituted aryl group or a substituted or unsubstituted heteroaryl group;  $n$  is an integer of from 1 to 3; and  $\text{B}_2$  represents the following formula 8,

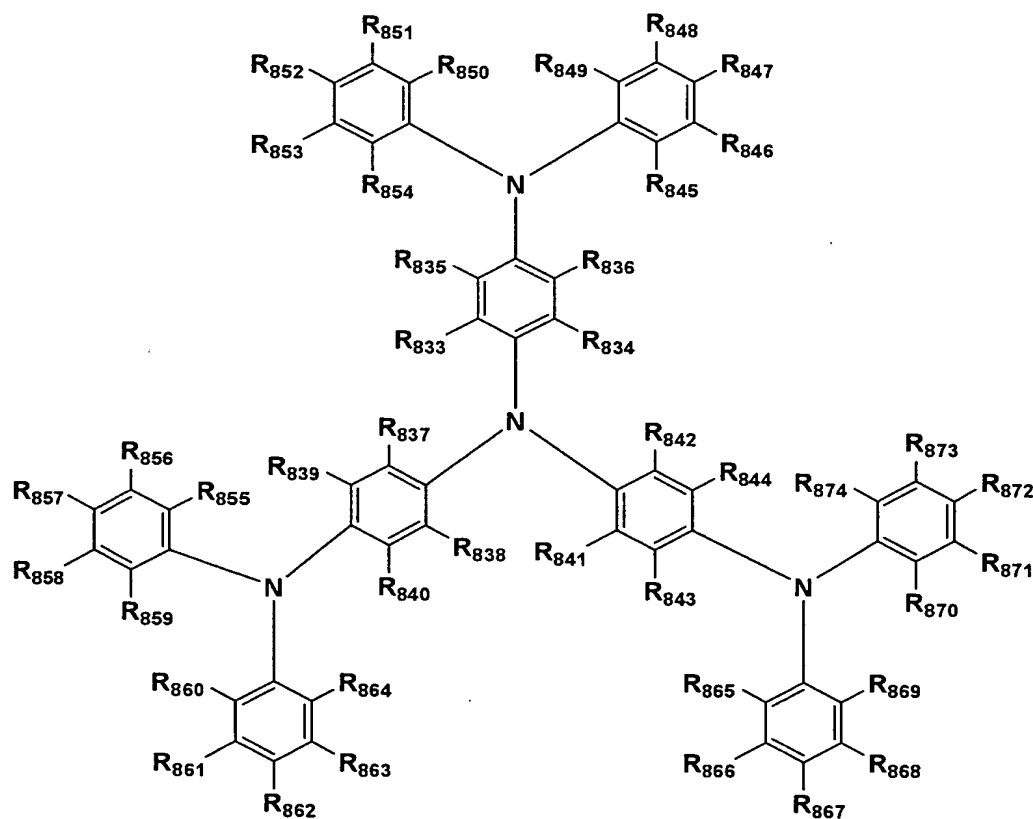
Formula 8



wherein  $X_5$  and  $X_8$  independently represent N or C- $R_{501}$  in which  $R_{501}$  represents a hydrogen atom or a substituent, provided that at least one of  $X_5$  and  $X_6$  represents C- $R_{501}$  in which  $R_{501}$  represents a substituent, and at least one of  $X_7$  and  $X_8$  represents C- $R_{501}$  in which  $R_{501}$  represents a substituent.

33. The organic electroluminescent element of claim 27, wherein the triarylamine compound is a compound represented by the following formula 9,

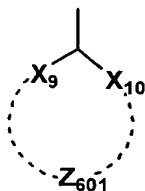
Formula 9



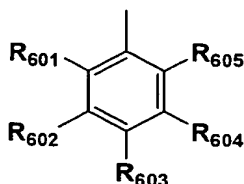
wherein  $R_{833}$  through  $R_{874}$  independently represent a hydrogen atom or a substituent, provided that at least one of  $R_{833}$  and  $R_{834}$  is a substituent, at least one of  $R_{835}$  and  $R_{836}$  is a substituent, at least one of  $R_{837}$  and  $R_{838}$  is a substituent, at least one of  $R_{839}$  and  $R_{840}$  is a substituent, at least one of  $R_{841}$  and  $R_{842}$  is a substituent, and at least one of  $R_{843}$  and  $R_{844}$  is a substituent.

34. The organic electroluminescent element of claim 27, wherein the triarylamine compound is a compound having a terminal group represented by the following formula 10-1, 10-2, 10-3 or 10-4,

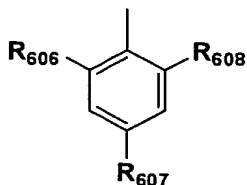
Formula 10-1



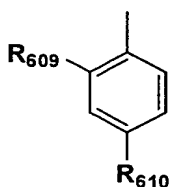
Formula 10-2



Formula 10-3



Formula 10-4



wherein  $X_9$  and  $X_{10}$  independently represent N, O, S or  $CR_{611}$  in which  $R_{611}$  represents a hydrogen atom or a substituent, provided that at least one of  $X_9$  and  $X_{10}$  represents  $CR_{611}$  in which  $R_{611}$  represents a substituent;  $Z_{601}$  represents an atomic group necessary to form an aromatic hydrocarbon ring or an aromatic heterocyclic ring;  $R_{601}$  through  $R_{605}$  independently represent a hydrogen atom or a substituent, provided that at least one of  $R_{601}$  and  $R_{605}$  is a substituent; and  $R_{606}$  through  $R_{610}$  independently represent a substituent.

35. The organic electroluminescent element of claim 27, wherein the hole transporting material has a molecular weight of not less than 550.

36. The organic electroluminescent element of claim 27, wherein the hole transporting material has an ionization potential  $I_{p1}$  of from 5.00 to 5.70 eV.

37. The organic electroluminescent element of claim 27, wherein

$$-0.1 \text{ (eV)} \leq I_{p3} - I_{p1} \leq 0.5 \text{ (eV)}$$

where  $I_{p1}$  (eV) represents the ionization potential of the hole transporting material, and  $I_{p3}$  (eV) represents the ionization potential of the phosphorescent compound.

38. The organic electroluminescent element of claim 27, wherein

$$0.5 \text{ (eV)} < T3 - E_{a1} < 1.3 \text{ (eV)}$$

where  $T3$  (eV) represents the excited triplet energy level of the phosphorescent compound and  $E_{a1}$  (eV) represents the electron affinity of the hole transporting material.

39. The organic electroluminescent element of claim 27, wherein the phosphorescent compound has a phosphorescence maximum in the wavelength regions of from 380 to 480 nm.

40. The organic electroluminescent element of claim 27, further comprising a second hole transporting layer containing a second hole transporting material, the second hole transporting layer being provided on the surface of the

hole transporting layer opposite the light emission layer,  
wherein

$$0.1 \text{ (eV)} < I_{p1} - I_{p4} < 0.7 \text{ (eV)}$$

where  $I_{p1}$  (eV) represents the ionization potential of the hole transporting material, and  $I_{p4}$  (eV) represents the ionization potential of the second hole transporting material.

41. The organic electroluminescent element of claim 40, wherein the thickness of the hole transporting layer adjacent to the light emission layer is from 5 to 20 nm.

42. The organic electroluminescent element of claim 27, wherein the light emission layer further contains a host compound.

43. The organic electroluminescent element of claim 27, wherein

$$0.3 \text{ (eV)} < I_{p2} - I_{p1} < 1.0 \text{ (eV)}$$

where  $I_{p1}$  (eV) represents the ionization potential of the hole transporting material and  $I_{p2}$  (eV) represents the ionization potential of the host compound.

44. The organic electroluminescent element of claim 27, wherein

$$0.1 \text{ (eV)} < E_{a2} - E_{a1} < 0.8 \text{ (eV)}$$

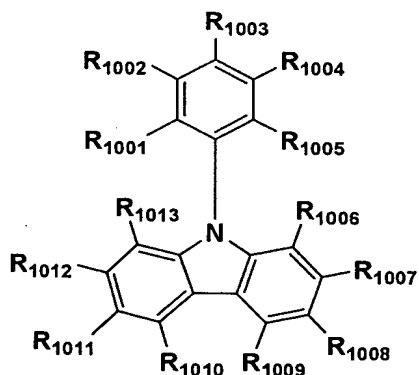
where  $E_{a1}$  (eV) represents the electron affinity of the hole transporting material and  $E_{a2}$  (eV) represents the electron affinity of the host compound.

45. The organic electroluminescent element of claim 27, wherein the host compound has a 0-0 band of the phosphorescence spectra of from 300 to 450 nm.

46. The organic electroluminescent element of claim 27, wherein the host compound is a carbazole derivative.

47. The organic electroluminescent element of claim 46, wherein the carbazole derivative is a compound represented by the following formula 11,

Formula 11

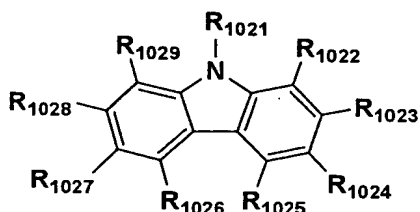


wherein  $R_{1001}$  through  $R_{1013}$  independently represent a hydrogen atom or a substituent, provided that at least one of  $R_{1001}$  through  $R_{1013}$  is a substituent.



48. The organic electroluminescent element of claim 46, wherein the carbazole derivative is a compound represented by the following formula 12,

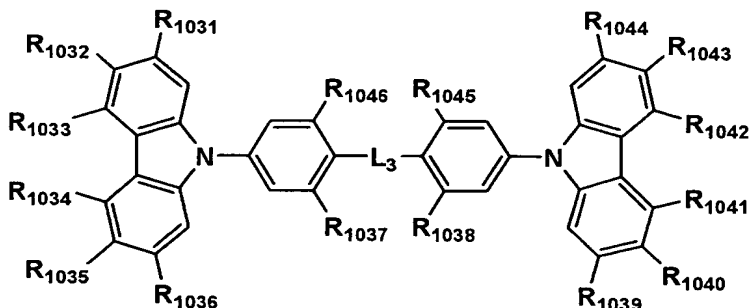
Formula 12



wherein  $R_{1021}$  represents an alkyl group, a cycloalkyl group or a fluoroalkyl group; and  $R_{1022}$  through  $R_{1029}$  independently represent a hydrogen atom or a substituent, provided that at least one of  $R_{1022}$  through  $R_{1029}$  is a substituent.

49. The organic electroluminescent element of claim 46, wherein the carbazole derivative is a compound represented by the following formula 13,

Formula 13

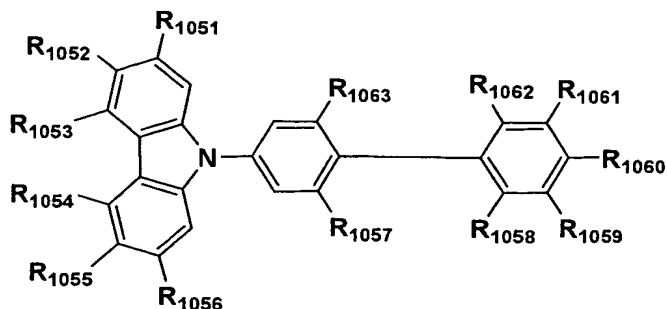


wherein  $R_{1031}$  through  $R_{1046}$  independently represent a hydrogen atom or a substituent; and  $L_3$  represents a chemical bond or a

divalent linkage group, provided that when  $L_3$  represents a chemical bond, at least one of  $R_{1037}$ ,  $R_{1038}$ ,  $R_{1045}$ , and  $R_{1046}$  is a substituent.

50. The organic electroluminescent element of claim 46, wherein the carbazole derivative is a compound represented by the following formula 14,

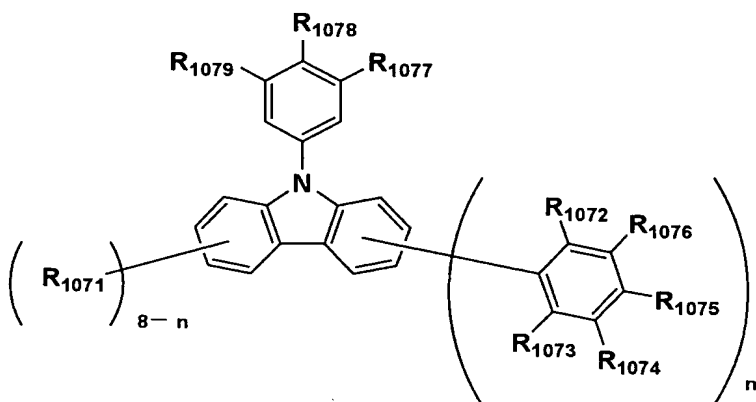
Formula 14



wherein  $R_{1051}$  through  $R_{1063}$  independently represent a hydrogen atom or a substituent, provided that at least one of  $R_{1057}$ ,  $R_{1058}$ ,  $R_{1062}$ , and  $R_{1063}$  is a substituent.

51. The organic electroluminescent element of claim 46, wherein the carbazole derivative is a compound represented by the following formula 15,

Formula 15



wherein R<sub>1071</sub> through R<sub>1079</sub> independently represent a hydrogen atom or a substituent, provided that at least one of R<sub>1072</sub> and R<sub>1073</sub> is a substituent; and n is an integer of from 1 to 8.

52. The organic electroluminescent element of claim 1, wherein the hole transporting layer is formed according to a vacuum deposition process.

53. The organic electroluminescent element of claim 1, wherein the hole transporting layer is formed according to a wet process.

54. A display comprising the organic electroluminescent element of claim 1.

55. An illuminator comprising the organic electroluminescent element of claim 1.

56. A display comprising the illuminator of claim 55, and a liquid crystal element as a displaying means.